King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics

SYLLABUS Math 232

Semester I, 2012-2013(121)

Instructor: Dr. Othman Echi

Course:	Math 232
Title:	Introduction to Sets and Structures
Textbook:	Introduction to Mathematical Structures and Proofs by Larry J. Gerstein; and Contemporary Abstract Algebra (6e) by Joseph A. Gallian.
Objectives:	This course is intended to introduce students to some fundamental concepts in mathematics and to familiarize them with mathematical proofs and rigor. The aim is to provide students with the appropriate background for more advanced courses in mathematics.
Catalogue Description	Elementary logic. Methods of proof. Set theory. Relations and functions. Finite and infinite sets. Equivalence relations and congruence. Divisibility and the fundamental theorem of arithmetic. Well-ordering and axiom of choice. Groups, subgroups, symmetric groups, cyclic groups and order of an element, isomorphisms, cosets and Lagrange's Theorem.

Lectures: Saturday/Monday/Wednesday 8.00-8.50 ; Building 7, Room 100

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Grading Policy: Four Tests 40%; HW +Attend 30%; Final Exam 30%.

EXAMS:

1. **Tests:** Date, time and location TBA
2. **Final exam (comprehensive):** Wednesday, January 2, 2013, 7:00 PM

Lectures	Sections	Material
1, 2, 3	1.1 1.2 1.3	Statements, propositions and theorems Logical connectives and truth tables Conditional statements
4, 5, 6	1.4 1.5	Proofs: structures and strategies Logical equivalence
7, 8, 9	2.1 2.2 2.3	Sets: fundamentals Russell's paradox Quantifiers
10, 11, 12	2.4 2.5 2.6	Set inclusion Union, intersection and complement Indexed sets
13, 14, 15	2.7 2.8	The power set Ordered pairs and Cartesian products
16, 17, 18	2.9 2.10	Partitions and relations Mathematical induction and recursion
19, 20, 21	3.1 3.2 3.3	Functions: definitions and examples Surjections, injections, bijections and sequences Composition of functions
22, 23, 24	4.1 4.2 4.3 4.4	Cardinality Comparing sets, finite or infinite Countable and uncountable sets More on infinity
25, 26,27	6.1 6.2 6.3	Operations The integers The fundamental theorem of arithmetic
28, 29, 30	6.4 6.5 6.6	Congruence Euler's function The inclusion-exclusion principle
31, 32, 33	Ch.2	Groups: definitions and examples Elementary properties of groups
34, 35, 36	Ch.3 Ch.4	Finite groups and subgroups Cyclic groups
37, 38, 39	Ch.5	Permutations Permutation groups
40, 41, 42	Ch.6	Isomorphisms and Cayley's theorem
43, 44, 45	Ch.7	Cosets and Lagrange's theorem

[Chapter references in the above table are to Gallian's Abstract Algebra]